

Application No. 09/636,286

RD-27791

**Amendments to the Claims**

This listing of claims will replace all prior versions and listings of claims in the application:

**Listing of Claims:**

1. (currently amended) A method to identify improved catalytic mixture entities, comprising steps of:

(A) forming a first population of catalytic mixture entities and detecting a catalytic property of each of said mixture entities by a ~~high-throughput screening (HTS)~~ combinatorial organic synthesis (COS) method; and

(B) executing a genetic algorithm based on said catalytic property of said entities to identify a second population of improved catalytic mixture entities.

2. (currently amended) The method of claim 1, wherein said step (B) comprises at least one operation selected from (i) mutation, (ii) crossover, ~~(iii)~~ (iii) mutation and selection (iv) crossover and selection and (v) mutation, crossover and selection.

3. (previously presented) The method of claim 1, comprising randomly identifying said first population of entities prior to forming said first population according to step (A).

4. (original) The method of claim 1, further comprising generating a binary string representing said first population of entities and step (B) comprises executing a genetic algorithm with a processor on said binary string to produce a binary string representing said second population of entities.

5. (original) The method of claim 1, further comprising generating a binary string representing variable parameters of said first population of entities and step (B) comprises executing a genetic algorithm with a processor on said binary string to produce a binary string representing said second population of entities.

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6. (previously presented) The method of claim 1, further comprising generating a binary string representing variable parameters of entities, forming said entities and selecting said first population from said entities and step (B) comprises executing a genetic algorithm with a processor on said binary string to produce a binary string representing said second population of entities.

7. (previously presented) The method of claim 1, further comprising generating a binary string representing variable parameters of entities, forming said entities, evaluating said entities for a desired property, weighting said entities according to an hierarchy of fitness of said property and selecting said first population as a sampling from said weighed entities and step (B) comprises executing a genetic algorithm with a processor on said binary string to produce a binary string representing said second population of entities.

8. (previously presented) The method of claim 1, further comprising generating a binary string representing variable parameters of entities, forming said entities, evaluating said entities for a desired property, pairing said entities and (B) comprises executing a genetic algorithm with a processor on said binary string to produce a binary string representing said second population of entities.

9. (previously presented) The method of claim 1, further comprising generating a binary string representing variable parameters of entities, forming said entities, evaluating said entities for a desired property and pairing said entities and (B) comprises executing a genetic algorithm comprising a uniform random crossover operator to produce a binary string representing said second population of entities.

10. (previously presented) The method of claim 1, further comprising generating a binary string representing variable parameters of entities, forming said entities, evaluating said entities for a desired property, weighting said entities according to an hierarchy of fitness according to said property, selecting said first population as a sampling from said weighed entities and pairing said entities and step (B) comprises executing a genetic algorithm with a processor on said binary string to produce a binary string representing said second population of entities.

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11. (original) The method of claim 1, further comprising conducting steps (A) and (B) on said second population of entities to produce a third population of entities.

12. (original) The method of claim 1, further comprising repeating steps (A) and (B) on said second population of entities and subsequent populations of entities until a fit entity is identified.

13. (canceled)

14. (canceled)

15. (canceled)

16. (original) The method of claim 1, wherein said first population of entities is a catalyst system.

17. (original) The method of claim 1, wherein said first population of entities is a catalyst system comprising a Group VIII B metal.

18. (original) The method of claim 1, wherein said first population of entities is a catalyst system comprising palladium.

19. (original) The method of claim 1, wherein said first population of entities is a catalyst system comprising a halide composition.

20. (original) The method of claim 1, wherein said first population of entities is a catalyst system that includes an inorganic co-catalyst.

21. (original) The method of claim 1, wherein said first population of entities is a catalyst system that includes a combination of inorganic co-catalysts.

22. (canceled)

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